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Mutual funds' exits, financial crisis and Darwin

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Abstract

It is well-recognized in the literature that performance and external environment are strong determinants of divestitures. This paper provides a theoretical justification in support of the thesis that the role of performance in determining divestitures declines during a market crash. The empirical analysis of the performance of over 19,000 U.S. mutual funds in the 2000–2014 period strongly supports the existence of the negative exit-performance relationship outside the period of the global financial crisis 2008, and shows that this relationship did not hold during the crisis. Such distortion to the role of performance in divestiture decision-making shows yet another impact global financial crisis 2008 has had on businesses and markets, and raises questions about ethical behavior of the asset management industry.

Keywords: mutual funds, performance, liquidations and mergers, divestitures, financial crisis

JEL classification: G23, G11, G01

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1. Introduction

The impact of the 2008 global financial crisis (GFC'08) on the business environment and practices has attracted a great deal of attention (e.g. Ivashina and Scharfstein, 2010; DeYoung and Torna, 2013; Brown and Petersen, 2015; Grout and Zalewska, 2016; Homar and van Wijnbergen, 2016). Numerous studies investigate the factors contributing to increased numbers of business exits (e.g. Fahlenbrach and Stulz, 2011; Beltratti and Stulz, 2012; Flannery, Simon, Kwan and Nimalendran 2013; Betz, Oprică, Peltonen and Sarlin, 2014; Köhler, 2015; Berger, Imbierowicz and Rauch, 2016) and the need to develop appropriate measures of performance assessment (e.g. Zwikael and Smyrk, 2012). The GFC'08 challenged not only organizations but also our understanding of their strategic behavior (e.g. Knight and McCabe, 2015). It also confirmed 'old truths' that the propensity towards maintaining high ethical standards weakens in periods of weak financial performance (Campbell, 2007). Indeed, numerous papers document that corporations took advantage of informational opaqueness of the markets during the GFC'08 (e.g. Fassin and Gosselin, 2011; Harrison and Berman, 2016; Dunhan, Jorgensen and Washer, 2016).

As the economic and business conditions worsened during the GFC'08, many businesses were forced out of the market. This creates an opportunity to develop our understanding of the rationale behind business exit decisions more generally (e.g. Chang, 1996; Cho and Cohen, 1997; Montgomery and Thomas, 1988; Villalonga and McGahan, 2005; Brauer, 2006; Moschieri, 2011; Decker and Mellewight, 2012, Kolev, 2016) and the relationship between exit and performance in different situations. Whether exit decisions are the consequence of economic/managerial failure that can no longer be hidden from the public (e.g. Chang, 1996) or, on a more positive note, are a sign of conscious strategic choice (e.g. Decker and Mellewight, 2012), they are associated with relative poor performance, although other factors are also shown to matter (e.g. Jayaraman, Khorana and Nelling, 2002; Wang and Huang, 2013). In this respect, exits and divestitures can be thought of as exhibiting an element of a "Darwinian" process, eliminating the weaker parts of a business (regardless of whether the relative performance is assessed in comparison with other projects run by the same corporation or in comparison to its competitors (Kolev, 2016), and regardless of whether it is assessed based on purely financial performance or includes non-financial goals (e.g. Villalonga and McGahan, 2005; Zwikael and Smyrk, 2012).

This paper focuses on the mutual fund industry to address the question of how the GFC'08 impacted on the role of performance in divestiture decisions. In the mutual fund industry, companies (referred to as fund-families, using the fund industry terminology) typically own and manage many individual mutual funds, and at various points exit some of these funds from the market. An attraction of the fund industry to address the impact of the crisis on the closure decision stems from the complexity of assessing the performance-divestiture relationship. The assessment of mutual funds'

performance is more straightforward than it is in the case of corporate projects and provides the opportunity to observe quick changes in the financial performance–divestiture relationship as the performance of mutual funds can be observed at a higher frequency (monthly or even daily) than the performance of corporate projects (typically annual). In the case of corporations, the identification of failing projects is additionally complicated by the fact that it is often impossible to get information about the performance of individual projects, and because corporations can engage in internal resource shifting to support failing undertakings. Furthermore, it is much easier to collect information about the performance of potentially comparable mutual funds than it is in the case of potentially comparable corporate projects, if one wishes to account for relative performance.

The paper addresses the question whether the exit–performance relationship was similar during the GFC’08 to that observed in other periods, particularly given that the impact of the GFC’08 on business failure rates is well documented (OECD, 2009). One could anticipate that the collapse of the markets during the GFC’08 was so massive that the natural processes where weaker performing parts of business were more likely to leave the market should be even stronger during the GFC’08 than they were in other periods. This is because only the strongest could survive such harsh market conditions. We argue, however, that the process of natural elimination of the weakest funds was distorted, not strengthened, during the GFC’08. This is because, paradoxically, companies (i.e. fund–families) may have found closing their worst performing funds less attractive during the period of dramatic, widespread negative returns, when some clients withdraw whatever is left of their investments from the industry, than during the periods when clients de–invest from the poor performers and invest in other funds they perceive as a better investment. The reduction of the number of investors left in the market may make it more profitable to make money from holding on to the clients left in the poorly performing funds than either closing these funds (which would incur closing costs) or moving the remaining clients to better performing funds in the same fund–family (which would incur merging costs), even though both of these latter options are available. Thus, it is entirely possible that the fund–families’ responses to the poor performance may be different during the GFC’08 than outside the crisis period, and management–investors interests may be less well aligned during the GFC’08 than at other times.

This idea and associated hypotheses are developed in the next section, and these are tested using U.S. mutual fund data. The choice of the sample is determined by data availability and industry size. The U.S. mutual fund industry is the biggest in the world, with over \$16 trillion of assets under management in 2016², and plays a major role in the U.S. pension market. According to ICI (2011) about 50 million of Americans use mutual funds as retirement savings, adding additional significance to our findings since differences in the performance–exit relationship at different times may have a

² <https://www.statista.com/statistics/255518/mutual-fund-assets-held-by-investment-companies-in-the-united-states/>

material long-term impact. Moreover, since investors of mutual funds are formally shareholders, changes in management-investors alignment at different periods may have implications for corporate governance.

2. Related literature and hypotheses development

2.1. Factors determining mutual funds' exits

Mutual funds' investors are a source of investment money and fees to the funds they invest in. Hence, any exodus of investors is unwelcomed and mutual funds pay great attention to advertising their services in order to attract new and maintain existing investors (e.g. Jain and Wu, 2000; Aydogdu and Wellman, 2011). In these efforts mutual funds may not always act ethically. For instance, it is well-documented that mutual funds may misinform investors about their investment strategies, risks taken and the fund's performance (e.g. Najand and Prather, 1999; Hillion and Suominen, 2004; Cooper, Gulen and Rau, 2005; Ortiz, Sarto and Vicente, 2012; Shirley and Stark, 2016). They also attempt to separate skilled from unskilled investors and offer better quality services to the former than to the latter ones (e.g. Christoffersen and Musto, 2002; Houge and Wellman, 2007; Gil-Bazo and Ruiz-Versy, 2009). The potential differential treatment of investors is an issue as many investors exhibit low financial literacy (e.g. Bernheim, 1995, 1998; Lusardi and Mitchell, 2006, 2007; Moore, 2003) and, therefore, are prone to falling a prey to unfair practices which, in turn, result in substantial financial losses (e.g. Bucher-Koenen and Ziegelmeyer, 2013; Chalmers, Kaul and Phillips, 2013; Guiso and Viviano, 2014; Gorjaev, Nijman and Werker, 2008; Grinblatt, Ikäheimo, Keloharju and Knüpfer, 2015).

Investors' vulnerability, and the associated 'dominant' position of fund-families, focuses particular attention on the role of mechanisms that may remove the worst performing funds, and the intensity of any Darwinian-type forces. There is a substantial body of the literature that documents that poor performance is an important factor in determining mutual funds' exit (e.g. Makadok and Walker, 1996; Jain and Wu, 2000; Jayaraman et al., 2002; Zhao, 2003; Khorana, Tufano and Wedge, 2007; Rohleder, Scholz and Wilkens, 2010; Wang and Huang, 2013; Cogneau and Hübner, 2015) and that the worst performing funds are more likely to be liquidated than to be merged with other funds (Zhao, 2003). It is also recognized that funds' volatility, flows, age, size, and expense ratios play a role in determining mutual funds' fate (e.g. Jayaraman et al., 2002; Zhao, 2003). For instance, the likelihood of funds being merged is inversely related to their size and flows (i.e. funds shares' redemptions and purchases), but positively related to their expense ratios (Zhao, 2003). It is also documented that funds with high 12b-1 (i.e., distribution and services fees) and management fees are liquidated more slowly than funds with low or no 12b-1 fees, and that funds with high 12b-1 and management fees are merged within family more quickly (e.g. English, Demiralp and Dukes, 2006; Dukes, English and Davis, 2011). This suggests that the exit decisions may not always be

driven by the best interest of investors (i.e. the quality of investment opportunities offered to them) but by how much fees they generate. Indeed, Evans, Ferreira and Porras Prado (2017) find evidence that at times fund-families may maximize the family's fee revenues at the expense of investors who hold poorly performing funds. They do not, however, consider whether such behavior may be more pronounced under certain market conditions than others. Intuitively one might suspect that some market conditions, and in particular something as dramatic as GFC'08, may create an environment more prone for mutual funds to take advantage of investors. This intuition underlines our core analysis.

2.2. Hypotheses

The aim of this section is to provide a simple partial equilibrium model that elucidates how forces may differ between non-crash market conditions and a crash. We use a two period approach to compare fund exit preferences of fund-families, and show that there are sound theoretical grounds to support the notion that poorly performing funds may be relatively more valuable to fund-families when the market crashes than in other times.

To do this we assume a simple two period world in which a fund-family offers two funds, *A* and *B*, at the start of period 1. These funds are run by different managers, who differ in their ability to perform, but neither the investors nor the fund-family know the quality of the managers at the start of period 1. Hence, the funds have the same expected return, $R > 0$. Furthermore, we assume that when the funds open, they attract the same number of investors, N , and the same mix of investors. There are two types of investors, those who are sensitive to whether the fund delivers the expected return in period 1 and, based on the observed returns, will decide whether to stay with the fund or not, and those investors who will keep their investment through period 2 regardless of the return in period 1. We refer to the first type of the investors as “active”, and they comprise α of the investor population, $0 < \alpha < 1$. The second type of investors is referred to as “passive” and, by construction, they comprise $(1-\alpha)$ of the investor population. Their probability of continuing investing in period 2 is one regardless of the outcome of the fund performance, unless the fund is closed-down. If the fund is merged with another fund, we assume that passive investors stay with this new fund created by the merger.

We assume that both funds, *A* and *B*, charge investors the same per period fee $f > 0$, and that funds are subject to a fixed cost $F > 0$, and a variable cost per investor $c > 0$. The fees are assumed high enough to compensate for the fund's costs.

The time line is as follows. (1) Managers make investments at the start of period 1. (2) At the end of period 1 the (profit maximizing) fund-family observes the realized return. (3) In the light of the returns the fund-family decides whether to reorganize the existing funds or whether to leave them as they are. (4) The investors observe the returns and any restructuring decision and active investors

decide whether to stay with the fund for period 2, or move. (5) Those managers still in place invest for period 2. (6) Period 2 returns are observed at the end of period 2. Our primary interest is in steps (3) and (4) and how these may differ in a non-crash market and in a crash. We consider these in turn.

A non-crash market

This is a partial equilibrium model but implicitly we assume that in the background, there will be many similar fund-families and funds, although we are not directly concerned with their issues.³ To understand the fund-family's decision to reorganize or not to reorganize the existing funds, let us assume that fund *A* performs at least as well as expected, i.e. earns at least return R , but fund *B* underperforms and earns less than R . Given that the return on fund *A* is at least as expected, all the active investors investing in fund *A* will infer that it is more probable that the fund's/manager's quality is good, and will extend their investment with fund *A* into period 2. Thus, the expected profit, Π_A , to the fund-family from operating fund *A* in period 2 is:

$$\Pi_A = (f - c)\alpha N + (f - c)(1 - \alpha)N - F. \quad (1)$$

In contrast, the fund-family realizes that the active investors investing in fund *B* will be disappointed, will infer that it is more probable that the fund's/manager's quality is less good, and are, upon observing the return, likely to leave the fund. For simplicity of argument, let us assume that, in the market, there are many comparable funds offered by other fund-families, so fund *B*'s active investors have no difficulties in finding alternative investments with other fund-families, once they decide to leave fund *B*. Therefore, if all the active investors leave, the expected profit to the fund-family from operating fund *B* in period 2, if no action was taken, is:

$$\Pi_B = (f - c)(1 - \alpha)N - F. \quad (2)$$

In the light of this, the fund-family, observing the return ahead of the investors, has the following three options: (i) liquidate fund *B*, (ii) merge fund *B* with fund *A*, or (iii) take no action and run fund *B* with the passive investors only. We consider each of these options in turn and compare them with each other.

If the fund-family decides to liquidate fund *B*, this will result in losing all its investors and will bring additional costs of liquidation the fund $\rho_L > 0$. In this case, the fund-family's expected profit in period 2 is:

$$\Pi_L = (f - c)\alpha N + (f - c)(1 - \alpha)N - F - \rho_L = \Pi_A - \rho_L, \quad (3)$$

where Π_A is given by (1).

If the fund-family decides to merge fund *B* with fund *A*, she will keep all the active investors of fund *B* (since they are joining a fund with a high probability of a good manager), the active

³ One way of looking at the situation would be to assume that the market offers an infinite number of funds/fund-families who have earned at least R in period 1, so the probability of investors moving their investments to another fund-family, if they wish to leave the current fund, is one.

investors of fund A and both sets of passive investors. Therefore, the merged fund will be twice the size of the original funds, but the fund–family will have to cover the merging cost, $\rho_M > 0$. Thus, in the case of merger, the fund–family’s expected profit in period 2 is:

$$\Pi_M = 2(f - c)\alpha N + 2(f - c)(1 - \alpha)N - F - \rho_M = 2\Pi_A + F - \rho_M, \quad (4)$$

where Π_A is given by (1).

Finally, if the fund–family decides to take no action in regard to fund B , their expected profit in period 2 is:

$$\Pi = \Pi_A + \Pi_B, \quad (5)$$

where Π_A and Π_B are given by (1) and (2) respectively. Which of these options would the fund–family prefer?

The comparison of (4) and (5) shows that the fund–family would prefer to merge the funds rather than let the active investors leave if

$$(f - c)\alpha N > \rho_M - F. \quad (6)$$

This happens if the reduction in the profit resulting from losing the active investors is greater than the difference between the cost of merger and the fixed cost of running the fund.

On the other hand, the fund–family would prefer to liquidate fund B rather than keep it running in its reduced size, if

$$(f - c)(1 - \alpha)N < F - \rho_L. \quad (7)$$

A crash market

We now repeat the exercise, under the assumption that the markets performed badly during period 1, i.e. it is not only fund B , but also fund A and the funds run by the fund–family’s competitors perform below the investors’ expectations set at the start of period 1. We allow for the possibility that some of the active investors may leave the market completely regardless of whether their fund performed better than other funds. In this scenario, the fund–family is aware that some active investors of both funds A and B will leave regardless of her actions. However, a fraction of the active investors will stay with the current fund.⁴ We denote by p_A and p_B ($p_A > 0$, $p_B > 0$) the fractions (or probabilities) of the active investors staying with funds A and B respectively. To focus our attention let us assume that $p_A > p_B$. Therefore, the fund–family’s profits from running funds A and B in period 2 are

$$\Pi_{A, \text{crash}} = (f - c)p_A\alpha N + (f - c)(1 - \alpha)N - F. \quad (8)$$

and

$$\Pi_{B, \text{crash}} = (f - c)p_B\alpha N + (f - c)(1 - \alpha)N - F. \quad (9)$$

⁴ This is a plausible assumption as Johnson (2010) shows that some investors’ decisions to sell/retain their holdings in current funds are driven by the existence of better investment opportunities rather than the poor performance.

In this case, if the fund-family decides to liquidate fund B or merge it with fund A , the respective expected profits are:

$$\Pi_{L, crash} = (f-c)p_A\alpha N + (f-c)(1-\alpha)N - F - \rho_L = \Pi_{A, crash} - \rho_L, \quad (10)$$

$$\Pi_{M, crash} = 2(f-c)p_A\alpha N + 2(f-c)(1-\alpha)N - F - \rho_M = 2\Pi_{A, crash} + F - \rho_M, \quad (11)$$

assuming that the costs of liquidating and of merging remain the same as in the non-crash market. Taking no action would give the expected profit

$$\Pi_{crash} = \Pi_{A, crash} + \Pi_{B, crash}, \quad (12)$$

where $\Pi_{A, crash}$ and $\Pi_{B, crash}$ are defined by (8) and (9) respectively.

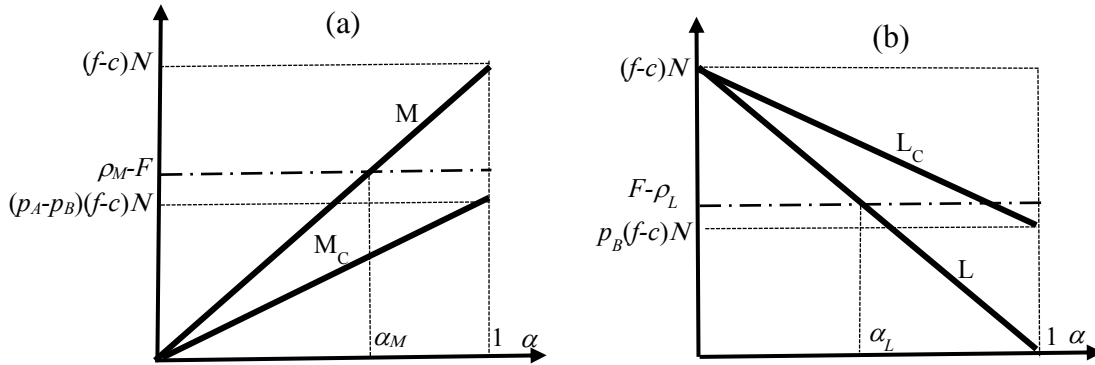
Thus, condition (6) of preferring to merge fund B with fund A rather than to take no action, and condition (7) of preferring to liquidate fund B rather than take no action become respectively:

$$(f-c)\alpha N(p_A - p_B) > \rho_M - F. \quad (13)$$

$$(f-c)(1 - (1+p_B)\alpha)N < F - \rho_L. \quad (14)$$

Figure 1 illustrates how these conditions change in comparison with the conditions (6) and (7) for mergers (Panel a) and liquidations (Panel B). The left-hand sides of the conditions are depicted by the position of the continuous lines marked by M for mergers and L by liquidations, and the subscript 'C' corresponding to a crash market. The right-hand sides of the conditions are marked by the dash-dot lines. α_M and α_L denote the critical values of α above which the fund-family prefers to merge and liquidate fund B, respectively, rather than take no action in a non-crash market.

Figure 1. Comparison of the conditions under which fund-families prefer to merge funds rather than take no action (Panel a), or liquidate funds rather than take no action (Panel b) in non-crash and crash markets.



Thus, Figure 1a shows that for a given combination of the model parameters, as α increases, the incentive to take no action declines. Moreover, during a market crash the slopes of the left-hand sides change. in the case of mergers,

First, notice that even if the provider prefers to liquidate fund B in the non-crash market, she may prefer not to do so during the crash. This is because, even if (7) holds in the non-crash market, it may be that in the crash $-\rho_L < (f - c)p_B\alpha N + (f - c)(1 - \alpha)N - F$. In other words, it may be that $0 < -\rho_L - \Pi_B < (f - c)p_B\alpha N$.

So even a small retention rate of the active investors, p_B , may be sufficient to change the fund-family's decision and 'save' a fund from being liquidated. This can arise for example, when the negative profit generated by the fund, when operated with the passive investors only, is similar to the cost of liquidation (i.e. $-\rho_L - \Pi_B$ is positive but close to zero).

In the case of mergers, the fund-family will opt for taking no action in a crash whilst preferring to merge them in the non-crash market if:

$$\Pi_A^{crash} - \Pi_B^{crash} < \rho_M - F < \Pi_A - \Pi_B. \quad (13)$$

Simple algebraic manipulations, using (1), (2), (10) and (11), show that (13) is equivalent to

$$(f - c)(p_A - p_B)\alpha N < \rho_M - F < (f - c)\alpha N. \quad (14)$$

So, assuming that the right-hand side inequality holds in the non-crash market, the left-hand side inequality can hold in a crash if $\rho_M \geq F$ and $(p_A - p_B)$ is close to zero. Indeed, if $p_A = p_B$, then the left-hand side is equal to zero, and (12) holds as long as (6) holds.

Figure 1 illustrates how the outflow of investors may impact on the decision of the provider to merge/liquidate funds in non-crash and crash markets (the latter ones denoted by the subscript 'C'). The line marked M_D corresponds to the left-hand side of (6) and dot-dash line at the $\rho_M - F$ level corresponds to the right-hand side of (6). It shows that if the fund's α was greater than α_M , then merger is the preferred action for the provider. If the relative cost of merging over the fixed cost of running the fund is lower than shown in Figure 1(a) (i.e. the dot-dash line is below the one plotted), then α_M would move to the left of the one marked in Figure 1(a). This is consistent with the intuition that the decline in the relative cost of mergers increases their occurrence, i.e. it is optimal to merge funds with the proportion of active investors lower than α_M .

Figure 1(b) shows how outflow of investors affects re-organisation decisions during a crash. Line M_C represents the right-hand side of $(f - c)N(p_A - p_B)\alpha > \rho_M - F$. is equivalent to M_D in the crash, i.e. it is obtained from the comparison of (11) and (12). More precisely M_C Given that $1 > p_A - p_B \geq 0$, M_C is less steep than M_D . It that it would not be optimal for the provider to merge the fund during the marker crash at all regardless of the proportion of its active invesors even though it was optimal to do so in the Darwinian market if its $\alpha > \alpha_M$.

Lines L_D and L_C are equivalent to M_D and M_C but obtained for the liquidation conditions for the Darwinian and the crash market, respectively. The dot-dash line at the $\rho_L - F$ level is the right

hand side of the corresponding inequalities and equivalent to ρ_{M-F} in the merger case. Once more, Figure 1 shows that the incentive to liquidate funds declines during the crash as the p_B increases. Figure 1 shows that when investors are leaving $\Pi_{\text{reorganize}}$ will decline as α increases. Label the new relationship $\Pi_{\text{reorganize}}$. Hence, in a crash the new point of intersection will move to the right, call this α^* , and the relationship between exit and poor performance is much weaker. Indeed, if almost every fund in the market performs poorly, then B may also lose less investors compared to the situation when there are lots of better performing alternatives. Thus, the slope of $\Pi_{\text{no action}}$ could rise as well weakening the relationship between poor performance and exit even more. Indeed, either of these effects could lead to the relationship between poor performance and exit to break down entirely. Therefore, in a market crash, the “Darwinian” forces are not strong enough to eliminate the worse performing funds.

3. Data and methodology

To test the hypotheses two samples were constructed based on the data provided by the Centre for Research in Security Price (CRSP) Survivor–Bias Free U.S. Mutual Fund Database: (i) the sample of funds that stopped operating between January 2000 and December 2014, and (ii) the comparator sample containing all funds that have not exited the market or were the result of merger between January 2000 and June 2015. Throughout the paper, these two samples are referred to as the exit sample and the survivor sample, respectively. Before the sample characteristics are discussed in detail we discuss the specification of non–crash and crash markets.

3.1. Non–crash and crash markets

It is important that the separation into crash and non–crash periods is objective in the sense that it is not based on characteristics of the mutual funds themselves. The assumption that during a non–crash period investors of poorly performing funds have attractive, alternative investment opportunities while during a crash period such opportunities are considerably limited is critical. A crash market is more than just a bear market, it is a market of dramatic decline across a wide range of sectors and, therefore, it is a market of considerably reduced investment opportunities. In contrast, a non–crash period offers a range of investment opportunities that are attractive to investors.

We argue that within the period 2000–2015, the GFC’08 is the sole period that can be classified as a crash. In 2008 all sector indexes fell dramatically. The heaviest decline was experienced by the financial sector and its index declined 53 percent between October 2008 and March 2009. Telecommunication stocks lost least, only -23 percent. Consumer confidence also declined dramatically during the financial crisis. According to Gros and Alcaide (2010), the U.S. Standardized Happiness Index (US–SHI) that measures consumer confidence declined from the level

of about 1 in 2006 to -3 in 2009. The scale of the decline was truly unique to the GFC'08. For example, in comparison, the US-SHI declined from about 1 in 1999 to -0.5 in 2002 during the post-dotcom bubble burst of 2000, which is the only other period of market decline in our sample.⁵ Moreover, in contrast with the GFC'08, the decline of the stock markets was concentrated on high-tech related industries. While between January 2000 and March 2003, the technology and the telecommunication stocks lost 74 percent and 71 percent respectively, some sectors still offered attractive investment opportunities. For instance, the retailer index gained 98 percent over the same time. That is, the post dotcom correction clearly separated high-tech and, so-called, "old-economy" stocks, providing savvy investors with positive investment opportunities.⁶

This suggests that any distortion of the "Darwinian" exit forces along the lines that have been discussed in the previous section should be more pronounced during the GFC'08 than during the other periods, including the post-dotcom correction. Consequently, if our hypothesis that poorly-performing funds are of relatively higher value to fund-families during a crash than they are during non-crash times is correct, one should expect to observe that differences in the performance between the exit and the surviving funds were weaker during the GFC'08 than during the other periods. Therefore, in summary, our core hypotheses are that in the periods other than the GFC'08 the differences between the returns earned by the funds prior to their liquidation or within-family merger and by the equivalent surviving funds (i.e. funds with the same investment style, age, size, etc.) are negative and statistically/economically significant. In contrast, these differences decline and even potentially become statistically/economically insignificant during the GFC'08.

3.2. The exit sample

According to CRSP 8,519 funds exited the market between January 2000 and December 2014. This sample includes all types of mutual funds available on the U.S. market, including equity funds, international funds, bond funds, and sector funds. This sample was screened for funds with incomplete information of monthly returns (only the primary classes are used in the analysis). A fund was removed from the sample if its return time series ended two or more months before the exit date. This left 8,323 exit funds with complete monthly returns for the period of up to two years before the exit date, i.e. the performance and other fund characteristics were collected for January 1997–December 2014. These funds came from 887 fund-families and represent 64 different investment styles.

⁵ The Conference Board's Consumer Confidence Index reached its historically lowest level of 26 in early 2008. The lowest value of the index during the dotcom bubble correction was 61. The average value of the index for 2003–2007 was just above 100. Differences in consumer confidence and its co-movement with market indexes are discussed in Ferrer, Salaber and Zalewska (2016).

⁶ Grout and Zalewska (2006) document changed in market risk between the old and the new economy stocks during the dotcom bubble. Grout and Zalewska (2016) provide the discussion of the changes of market risk between financials, utilities and industrial stocks during the financial crisis.

Within this sample, 2,345 funds were reported as liquidated, 3,496 as merged and 1,660 did not have a specified way of exiting the market.⁷ Using the webpages of the U.S. Securities and Exchange Commission (SEC)⁸ and of the Bloomberg Company Overview (BCO) the sample was manually extended to 3,103 liquidated funds, 4,497 merged funds and 836 funds without information about the form of exit. Table 1 provides the numbers of funds in each exit category for the four sub-periods of interest, and for the whole period.

Table 2. Numbers of exit funds by sub-period and exit type

	1/2000–3/2003	4/2003–9/2008	10/2008–3/2009	4/2009–12/2014	Total
Liquidation	459	830	154	1,660	3,103
Merger	681	1,242	112	1,462	3,497
Unclassified	86	177	98	475	836
Total	1,226	2,249	364	3,597	7,436

As the previous literature shows, funds with particular characteristics (e.g. smaller, younger, etc.) are more likely to exit the market. Therefore, to ensure that like-with-like funds are compared in the further analysis, the following information was collected for each fund: fund's specialization, age, size, expense ratios, 12b–1 fees and turnover ratio. The specialization of funds is determined by objective codes provided by CRSP. Fund's age is defined as the number of years that the fund has been in operation up to the fund's exit date. Size is the amount of a fund's total net assets (in millions of U.S. dollars) reported in the latest month before its exit. The 12b–1 fee and the expense ratio are as reported in the most recently completed fiscal year. The fund's turnover ratio is the minimum of aggregated sales or purchases of securities, divided by the average 12-month total net assets of the fund. Table 2 shows the means and the medians for these variables except for specialization plus the means and the medians for the 12-month returns before funds' closure. It shows that consistent with the previous research, liquidated funds tend to be younger and smaller than the merged ones. The average turnover ratio of the liquidated funds is higher than the corresponding statistics for the merged funds. The statistics presented in Table 3 confirm that the liquidated funds have, on average, lower expense ratios than the merged ones, which is consistent with the notion that fund-families prefer funds with higher fees.

Table 2. Descriptive statistics of the exit funds for the period 2000–2014.

	Within-family		Liquidation		Unclassified exit		All exit funds	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Return	4.353	5.143	0.668	2.502	-1.924	0.965	2.269	3.775
Age	11.49	9.6	7.307	5.274	7.865	6.022	9.610	7.633
Size	128.1	18.3	41.52	3.700	34.56	3.6	85.64	8.000
Expense	1.377	1.3	1.411	1.15	1.351	1.2	1.378	1.250

⁷ In this paper we concentrate in within-family mergers. There data on a small number of cross-family mergers and unclassified mergers were available. These were excluded from the analysis, as they did not have enough observations for a meaningful statistical analysis.

⁸ <http://www.sec.gov/cgi-bin/srch-edgar>

12b-1fee	0.419	0.25	0.364	0.25	0.38	0.25	0.386	0.250
Turnover	0.982	0.66	1.169	0.6	1.197	0.67	1.050	0.630
Obs.	3,497	3,497	3,103	3,103	836	836	8,323	8,323

Return – 12-month cumulative return net the expense ratios prior to exit (%); Age – number of years in operation prior to exit; Size – total net assets in the last month prior to exit (\$mln); Expense – expense ratio in the most recent completed fiscal year (%); 12b-1 Fee – marketing and distribution costs over the most recently completed fiscal year (%); Turnover – the minimum of aggregated sales or purchases of securities divided by the 12-month total net assets.

3.3. The sample of surviving funds

To be able to assess changes in the performance across time, the performance of the exit funds is compared against the performance of the funds that remained traded. It is important to ensure that the surviving group is not polluted by funds that are still in operation at the time of exit of a given exit fund but are to be shortly delisted themselves. Therefore, to ensure that the exit funds are not compared against those funds that are to exit the market in the near future, a sample of 10,879 funds that were in operation until June 2015 was collected. On average these funds were likely to be better performers, older and bigger. This is confirmed by Table 3 that shows the means and the medians of the core variables for the surviving funds. The statistics of the surviving funds are calculated till December 2014. The exit funds' statistics are as defined above (Table 2).

Table 3. The means and the medians for the surviving funds in operation over the period 2000–2014.

	Mean	Median
Returns	7.244	6.273
Age	17.578	16.633
Size	745.95	117.40
Expense	1.029	0.950
12b-1fee	0.278	0.244
Turnover	0.937	0.470
Obs.	10,879	10,879

Tables 2 and 3 shows that, on average, the surviving funds are about eight years older than the exit ones. They are also about eight times bigger, and have 0.34% lower expense ratios but comparable 12b-1 fees. The surviving funds also have considerably lower turnover ratios.

3.4. Performance assessment

There are mixed views on a time horizon investors consider when assessing a fund's performance and deciding whether to abandon it or not (e.g. Wilcox, 2003; Ivković and Weisbenner, 2009). Given that there is a lack of consensus on the length of time that performance should be assessed for, that the length may change with a change in market conditions, and that the decline of the stock markets during the GFC'08 lasted only six months, we discuss a wide range of the performance periods when assessing potential differences between the performance of the exiting and of the surviving funds. More specifically, the performance will be assessed for 6, 12, 18, and 24

months before funds' departure for the whole period 2000–2015 and for four sub-periods: (i) January 2000–March 2003, the period of stock market decline after the end of the dotcom bubble, (ii) April 2003–September 2008, the period of the market growth before the GFC'08; (iii) October 2008–March 2009, the decline of the market at the start of the GFC'08, and finally, (iv) April 2009–December 2014, the post–GFC'08 period.

4. Empirical analysis

As Section 3 documents that there are substantial differences between the characteristics of the exit and the surviving funds. To compare returns of the exit and of the surviving funds the propensity score matching developed by Rosenbaum and Rubin (1983) is adopted. To save space we present only the average treatment effects on treated (ATTs) obtained from the probit model used to estimate propensity scores in nearest-neighbor matching that allows for ties. The annualized cumulative returns and the annualized cumulative returns net of expenses calculated for 6, 12, 18, and 24 months before the fund closure are the variables of interest. The exit funds are the treated sample. Two different sets of matching variables will be used. First, the exit funds' investment objectives, age, size, flows, expense and fund's family are used for matching when the effect on the annualized cumulative returns is being assessed. Next, when the annualized cumulative returns net of expense ratios are being compared, the expense ratios are removed from the set of the matching variables. The ATTs are calculated for all the exit funds and for the three identified exit groups (liquidation, within-family mergers and across-family mergers) for the whole period 2000–2014, and for the four sub-periods as defined above.

The cost of running a fund may be one of the fundamental variables determining the fate of a fund. Fixed and variable costs, and the numbers of the remaining and of the leaving investors are unknown, therefore, it is impossible to control for the differences in running costs across funds. The only variable that potentially provides some proxy for the size of costs is the expense ratio. Thus, to assess the differences between the exiting and surviving funds we compare their (i) returns net of expense ratios when fees are excluded from the set of matching variables and (ii) "gross" returns when the expense ratios are included in the set of matching variables.⁹ The results are presented in Tables 5 and 6 respectively. Both Tables are organized in the same way, first the results for all the exit funds pooled together are presented for the whole sample and for the four sub-samples. Then, the analogous results for the individual sub-groups of the exit funds are shown. First, the results for the liquidated funds are presented, then for the within-family merger funds, and finally, for the across-family merger funds.

⁹ We have also used 12b–1 fees. The results remained unchanged, although the number of funds used for matching declined as the 12b–1 fees are less commonly reported than expense ratios.

***** insert Table 5 here *****

***** insert Table 6 here *****

The first columns of Tables 5 and 6 confirm the universally accepted truth that exit funds are poor performers. When all exit funds are pooled together, regardless of the length of the time period of comparison, the exit funds perform statistically significantly worse than the surviving funds. Their relative underperformance is higher when the expense ratios are not used for matching. For instance, the difference between the annualized 6-month returns is -1.135 percent without matching for the expense ratios and -0.939 percent when the expense ratios are added to the matching variable list. The analogous figures for the 12-month returns are -1.580 percent and -1.313 percent.

The ATTs obtained for the four sub-periods (columns two-five of Tables 5 and 6) show strong support for our hypothesis that the GFC'08 distorted the process of elimination of the poorest performers. October 2008–March 2009 is the only sub-period for which the estimated ATTs are statistically insignificant. All the other sub-periods' estimates, but one, are statistically significantly negative at 1 percent, and that one that is not statistically significant at 1 percent is significant at 5 percent. None, of the ATTs of the funds that exited during the GFC'08 is statistically significant when the expense ratios were taken into account in the matching algorithm. When the expense ratios were omitted, the ATTs obtained for the 6-, 12- and 18-month performance were statistically insignificant. The 5 percent significance was obtained for the 24-month performance that expands far beyond the period of the financial crisis. Moreover, the coefficients were much smaller than the coefficients obtained for the other periods. For instance, the ATT obtained for the dot-com correction period (1/2000–3/2003) for the 24-month performance was -2.413 percent. The corresponding ATT estimated for 10/2008–3/2009 was -0.921 percent.

The results obtained for the funds that were liquidated or merged with another fund from the same fund-family confirmed that, during the GFC'08, the exit funds were not the worst performers. Only one out of the 20 ATT estimates was statistically significant, and its statistical significance was at 10 percent only. In contrast, the strong statistical significance was obtained for 57 out of 60 ATT estimates for the other (non-financial crash) sub-periods. The estimated effects are also economically significant. For instance, the difference in the performance between the exit and the surviving funds varied between -1.732 percent and -2.515 percent per annum for the within-family merger funds when the expense ratios were used in matching.

It is harder to draw a clear conclusion about the impact of the GFC'08 in the case of the across-family mergers due to the small across-family merger sample size in the 10/2008–13/2009 period. However, the results obtained for the other sub-periods show little statistical significance, suggesting that across-family mergers may be driven by factors other than funds' poor performance. As discussed, they may be part of a strategic shift.

The results presented so far were based on a narrow definition of funds' investment objectives. Given that there are over 60 different investment objective categories, using the narrow definition imposed a strong restriction on finding matching funds and resulted in many exit funds being excluded from the analysis. To test the robustness of our findings we slightly relaxed the investment objective matching criterion and grouped the investment objectives into five broad categories: domestic equity, foreign equity, fixed income, mixed fixed income and equity, and other funds. This increased the sample size by nearly 30 percent. Tables 7 and 8 present the results for this broad definition of the funds' investment objectives.

***** insert Table 7 here *****

***** insert Table 8 here *****

It is clear that these new sets of results are similar to those presented in Tables 5 and 6. The hypothesis that the GFC'08 is different from the other periods is fully confirmed. Once more, highly statistically significant results were obtained for all the sub-periods but the GFC'08. More statistical significance was also depicted for the across-family mergers. Similarly, to the results obtained for the other exit funds' groups, the estimates of the ATTs were negative and statistically significant for the whole period 2000–2014. However, the results obtained for the sub-periods, were not so uniform. Only the post dot-com correction period (1/2000–2/2003) showed that across-family merger funds consistently underperform the surviving funds. In contrast, six out of the eight ATTs estimated for the GFC'08 sub-sample were statistically significantly positive. There are very few observations in this category, so it is hard to put lots of weight on the finding, but it is consistent with the hypothesis that the GFC'08 was different from the other periods and that the across-family mergers may be ruled by different rules than the within-family mergers.

5. Discussion

In this paper we examine 8,323 U.S. mutual funds that exited the market between 2000 and 2014, and 10,879 U.S. mutual funds that operated between 2000 and 2015 to show that the exit-performance relationship weakened during the GFC'08. Our analysis based on the propensity score matching shows that the funds that exited the market through liquidation or within-family merger, on average, performed statistically and economically worse than matched surviving funds over the whole period of investigation, 2000–2014. In this way, we confirm the well-established expectation that the “Darwinian” forces are strong enough to eliminate the weakest funds from the market. The analysis of sub-periods shows that the exit-performance relationship is not universal. We show that it was considerably weakened during the GFC'08. That is, we show that the performance of the funds that were liquidated or within-family merged during the GFC'08 was not statistically significantly

different from the matched surviving funds. The GFC'08 is the only sub-period that shows the lack of “Darwinian” clearing mechanism at work. We also show that in the case of the funds that exited the market through across-family mergers the performance–exit relationship was also considerably weaker in the whole period and all the sub-periods.

These results are consistent with our theoretical hypotheses. We provide a partial-equilibrium theoretical model that gives a potential explanation for why management may choose to change their policy on which parts of the company (fund–family) to close during a market crash. The model illustrates that during a period of a crash, mutual fund-families’ may be more interested in “skimming” money from their remaining investors than acting in their investors’ best interest. In contrast, the model shows that during “normal” (non-crash) times, incentives to exit poorly performing funds are much stronger, and hence, fund–families’ interests are better aligned with those of their investors. We also argue that the across-family mergers may be driven by other motives than the need to reorganize poorly performing funds, and, therefore, they may not be subject to “Darwinian” clearing forces.

These results broaden our understanding of the specifics of the asset management industry, and in particular, they expose yet another side of the agency conflict. Numerous papers document poor investment opportunities offered by the asset management industry and argue that these are the result of low investment skills of fund managers (e.g. Del Guercio and Reuter, 2014) low strategic abilities of fund–families (e.g. Makadok, 1998), a lack of financial savvy and passivity of individual investors (e.g. Grinblatt et al., 2015). In other words, they argue that the poor performance results from incompetence. Our results add to the strand of the literature that points in the direction of cynical behavior and low ethics of asset managers and fund– families as the potential source of poor quality services offered to the public (e.g. Christoffersen and Musto, 2002; Houge and Wellman, 2007; Gil-Bazo and Ruiz-Versy, 2009; Evans et al., 2017).

More specifically, the paper finds support for the hypothesis that profit maximization strategies of fund–families change with market conditions in the way that benefits fund–families rather than investors. As such practices seem unfair and are congruent with the broader notion of agency conflicts between management (fund–families) and shareholders (mutual fund investors), they also open an interesting question on how different groups of shareholders (mutual fund investors) benefit/are disadvantaged by the fund–families’ practices. The corporate governance literature recognizes free-riding as one of the core failures of effective monitoring. One could argue that the fact that passive investors get a bad deal during a market crash is the investors’ own fault as they do not exercise their exit rights (Hirschman, 1970). Furthermore, this bad deal is offset by the benefits they derive during a non-crash market because they free-ride on the good deals fund–families have to offer active investors to keep them onboard. Even though there is truth in this argument, one should keep in mind that many individuals become mutual fund investors as part of retirement saving schemes rather than because of their own desire to trust their money to asset managers. Given that

their investment in mutual funds has been promoted as a retirement saving vehicle without ensuring that the individuals have appropriate investment skills and knowledge, it may not be appropriate to leave the investors exposed to, and financially disadvantaged by, asset management industry's unfair practices. This calls for more research on better understanding of how different groups of investors are affected by practices of asset managers and of fund-families and appropriate ways of moderating any market failures.

The focus on the mutual fund industry was, in part, driven by the fact that the assessment of the performance of individual funds comprising mutual fund-families is more straightforward than the assessment of the performance of individual projects comprising "traditional" companies. However, our contribution stretches far beyond mutual funds and the asset management industry. Our findings also contribute to the much broader strand of the literature concerned with the differences between parts of companies that are closed and not, and the circumstances when closures occur (e.g. Villalonga and McGahan, 2005; Brauer, 2006; Xia and Li, 2012) by addressing the question of why business exits may not happen when the empirical evidence is such that one would normally expect the termination decision to be taken. Our study provides evidence that a turbulent business environment and lack of investors' awareness may play an important role in distorting the traditional market-clearing mechanisms and encouraging the adoption of "short-term 'fire fighting'" strategies (Smart and Vertinsky, 1984).

The paper also contributes to the literature devoted to the understanding of the impact of the GFC'08 on the business environment (e.g. Knights and McCabe, 2015; Stein, 2015) and on business decision making (e.g. Ivashina and Scharfstein, 2010; DeYoung and Torna, 2013; Brown and Petersen, 2015). Our results confirm the negative impact of the GFC'08 on the business environment and that it contributed to the creation of conditions such that the mutual fund industry acted in a manner that took advantage of their shareholders. This research indirectly points at the weak ethics of the asset management industry. The asset management industry is known for its mistreatment of investors by offering, where possible, low quality services at high prices, misinforming investors about the nature of investments provided, etc. (e.g. Najaran and Prather, 1999; Cooper et al., 2005; Ortiz et al., 2012; Shirley and Stark, 2016). Yet, there is a convincing evidence that market forces are typically strong enough to eliminate the weakest performing funds. However, by showing that this was not the case during the GFC'08 we expose the cynical side of the mutual fund industry and contribute to the debate on the true effects of the GFC'08.

Given the importance of mutual fund investments for household finances and the position of the mutual fund industry on the global financial stage, it is important to understand the industry's practices and specifics in order to inform the debate on best practices and improve the design of regulation that aims to protect investors, and this paper contributes to this process. This is particularly important as the regulatory pressure to improve the asset management's transparency has been on

the rise (e.g. the MiFiD II initiative), there is a growing need to make sure that any regulatory changes are not a “knee-jerk” reaction of policy-makers but are based on sound academic evidence.

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Table 5. Average treatment effects on treated for propensity score matching on funds' objectives, age, size, flows and fund-family. The annualized cumulative returns net the expense ratios calculated over the period specified in the first column are the variables of interest. The exit funds and sub-categories (liquidation funds, funds merged within their own fund-family and funds merged outside the own fund-family) are the treated sample. P-values are reported in parenthesis. *** p<0.001; **p<0.05; *p<0.01.

<i>All exit funds</i>	2000–2014	1/2000–3/2003	4/2003–9/2008	10/2008–3/2009	4/2009–12/2014
6months	-1.135*** (0.000)	-2.031*** (0.000)	-1.549*** (0.000)	1.029 (0.182)	-0.822*** (0.003)
obs	9,922	1,390	2,984	404	5,144
12months	-1.580*** (0.000)	-2.704*** (0.000)	-1.878*** (0.000)	0.340 (0.563)	-1.243*** (0.000)
obs	9,714	1,354	2,968	372	5,020
18months	-1.565*** (0.000)	-2.691*** (0.000)	-1.907*** (0.000)	-0.671 (0.183)	-1.120*** (0.000)
obs	9,374	1,312	2,888	356	4,818
24months	-1.412*** (0.000)	-2.413*** (0.000)	-1.630*** (0.000)	-0.921** (0.039)	-1.054*** (0.000)
obs	8,962	1,208	2,798	346	4,610
<i>Liquidation</i>					
6months	-1.391*** (0.001)	0.113 (0.913)	-2.924*** (0.000)	-0.001 (0.999)	-1.185** (0.049)
obs	3,150	350	728	138	1,934
12months	-1.672*** (0.000)	-2.340*** (0.004)	-2.375*** (0.000)	-0.791 (0.514)	-1.341*** (0.001)
obs	3,016	338	706	130	1,842
18months	-1.644*** (0.000)	-2.911*** (0.000)	-2.491*** (0.000)	-1.728 (0.157)	-1.075*** (0.002)
obs	2,804	314	660	130	1,700
24months	-1.549*** (0.000)	-2.616*** (0.001)	-2.130*** (0.000)	-1.806 (0.108)	-1.113*** (0.000)
obs	2,584	268	626	124	1,566
<i>Within-family merger</i>					
6months	-0.906*** (0.000)	-2.448*** (0.000)	-0.772*** (0.005)	0.225 (0.803)	-0.532** (0.044)
obs	5,466	880	1,916	136	2,534
12months	-1.390*** (0.000)	-2.934*** (0.000)	-1.451*** (0.000)	0.121 (0.826)	-0.891*** (0.000)
obs	5,446	868	1,922	132	2,524
18months	-1.361*** (0.000)	-2.754*** (0.000)	-1.479*** (0.000)	-0.073 (0.883)	-0.858*** (0.000)
obs	5,382	854	1,908	126	2,494
24months	-1.237*** (0.000)	-2.455*** (0.000)	-1.344*** (0.000)	-0.124 (0.784)	-0.814*** (0.000)
obs	5,242	804	1,858	122	2,458
<i>Across-family merger</i>					
6months	-0.808 (0.373)	-2.885 (0.102)	-0.185 (0.885)	0.612 (0.765)	1.626 (0.275)
obs	226	76	110	8	32
12months	-0.868 (0.179)	-1.704 (0.154)	-0.607 (0.521)	0.967 (0.479)	-0.240 (0.850)
obs	226	76	110	8	32
18months	-1.733* (0.055)	-1.015 (0.602)	-2.582** (0.034)	0.836 (0.426)	-1.162 (0.264)
obs	226	76	110	8	32
24months	-1.426** (0.040)	-1.955 (0.217)	-1.585* (0.067)	0.538 (0.483)	-0.111 (0.874)
obs	226	76	110	8	32

Table 6. Average treatment effects on treated for propensity score matching on funds' objectives, age, size, flows, fund-family and expense ratios. The annualized cumulative returns calculated over the period specified in the first column are the variables of interest. The exit funds and sub-categories (liquidation funds, funds merged within their own fund-family and funds merged outside the own fund-family) are the treated sample. P-values are reported in parenthesis. *** p<0.001; **p<0.05; *p<0.01.

<i>All exit funds</i>	2000–2014	1/2000–3/2003	4/2003–9/2008	10/2008–3/2009	4/2009–12/2014
6months	-0.939*** (0.000)	-1.569*** (0.006)	-1.454*** (0.000)	0.929 (0.226)	-0.603** (0.017)
obs	9,494	1,326	2,934	372	4,862
12months	-1.313*** (0.000)	-2.334*** (0.000)	-1.704*** (0.000)	0.403 (0.467)	-0.923*** (0.000)
obs	9,464	1,324	2,930	366	4,844
18months	-1.300*** (0.000)	-2.286*** (0.000)	-1.696*** (0.000)	-0.437 (0.378)	-0.856*** (0.000)
obs	9,236	1,296	2,866	354	4,720
24months	-1.165*** (0.000)	-2.271*** (0.000)	-1.390*** (0.000)	-0.691 (0.117)	-0.768*** (0.000)
obs	8,880	1,200	2,788	344	4,548
Liquidation					
6months	-1.363*** (0.000)	0.604 (0.633)	-3.334*** (0.000)	0.246 (0.867)	-1.081** (0.047)
obs	2,900	320	694	130	1,756
12months	-1.533*** (0.000)	-2.093** (0.036)	-2.348*** (0.000)	-0.207 (0.855)	-1.193*** (0.002)
obs	2,874	322	680	130	1,742
18months	-1.466*** (0.000)	-2.356** (0.015)	-2.354*** (0.000)	-1.162 (0.305)	-0.973*** (0.003)
obs	2,738	310	648	130	1,650
24months	-1.381*** (0.000)	-2.611*** (0.001)	-1.927*** (0.000)	-1.222 (0.232)	-0.960*** (0.002)
obs	2,556	268	622	124	1,542
Within-family merger					
6months	-0.714*** (0.000)	-2.079*** (0.002)	-0.646** (0.019)	-0.030 (0.975)	-0.322 (0.215)
obs	5,390	862	1,906	130	2,492
12months	-1.162*** (0.000)	-2.515*** (0.000)	-1.265*** (0.000)	-0.236 (0.685)	-0.669*** (0.000)
obs	5,396	858	1,914	130	2,494
18months	-1.182*** (0.000)	-2.406*** (0.000)	-1.294*** (0.000)	-0.316 (0.598)	-0.723*** (0.000)
obs	5,348	846	1,902	126	2,474
24months	-1.089*** (0.000)	-2.303*** (0.000)	-1.128*** (0.000)	-0.514 (0.374)	-0.692*** (0.000)
obs	5,222	800	1,856	122	2,444
Across-family merger					
6months	-0.362 (0.684)	-2.739 (0.124)	0.289 (0.798)	0.734 (0.716)	2.768 (0.177)
obs	226	76	110	8	32
12months	-0.644 (0.283)	-1.375 (0.252)	-0.568 (0.481)	1.090 (0.407)	0.398 (0.762)
obs	226	76	110	8	32
18months	-1.398* (0.099)	-0.676 (0.732)	-2.172** (0.038)	0.958 (0.334)	-1.046 (0.298)
obs	226	76	110	8	32
24months	-1.067 (0.108)	-1.763 (0.279)	-1.050 (0.159)	0.661 (0.360)	0.096 (0.901)
obs	226	76	110	8	32

Table 7. Average treatment effects on treated for propensity score matching on funds' objectives, age, size, flows and fund-family for broadly defined objectives. The annualized cumulative returns net the expense ratios calculated over the period specified in the first column are the variables of interest. The exit funds and sub-categories (liquidation funds, funds merged within their own fund-family and funds merged outside the own fund-family are the treated sample. The fund objective is defined using a broader criterion, i.e. funds are grouped into 'domestic equity funds', 'foreign equity funds', 'fixed income funds', 'mixed equity and fixed income funds', and 'other funds'. P-values are reported in parenthesis. *** p<0.001; **p<0.05; *p<0.01.

<i>All exit funds</i>	2000–2014	1/2000–3/2003	4/2003–9/2008	10/2008–3/2009	4/2009–12/2014
6months	-1.388*** (0.000)	-3.124*** (0.000)	-1.670*** (0.000)	2.074* (0.080)	-0.931*** (0.007)
obs	12,614	2,074	3,890	564	6,086
12months	-1.926*** (0.000)	-4.441*** (0.000)	-1.875*** (0.000)	0.538 (0.503)	-1.310*** (0.000)
obs	12,334	2,026	3,876	506	5,926
18months	-1.958*** (0.000)	-3.932*** (0.000)	-2.246*** (0.000)	-0.255 (0.734)	-1.233*** (0.000)
obs	11,882	1,954	3,782	474	5,672
24months	-1.849*** (0.000)	-3.916*** (0.000)	-2.157** (0.000)	-0.505 (0.403)	-1.063*** (0.000)
obs	11,356	1,806	3,678	458	5,414
Liquidation					
6months	-2.013*** (0.000)	-1.828 (0.174)	-3.008*** (0.000)	-0.774 (0.725)	-1.704** (0.014)
obs	4,308	588	1,096	204	2,420
12months	-2.639*** (0.000)	-4.494*** (0.000)	-3.024*** (0.000)	-1.411 (0.352)	-2.089*** (0.000)
obs	4,104	566	1,082	170	2,286
18months	-2.345*** (0.000)	-3.597*** (0.000)	-2.858*** (0.000)	-1.752 (0.283)	-1.837*** (0.000)
obs	3,806	514	1,020	160	2,112
24months	-2.101*** (0.000)	-4.187*** (0.000)	-2.518*** (0.000)	-1.215 (0.334)	-1.483*** (0.000)
obs	3,504	444	970	150	1,940
Within-family merger					
6months	-0.665*** (0.008)	-2.539*** (0.001)	-1.056*** (0.003)	0.458 (0.709)	0.388 (0.279)
obs	6,412	1,178	2,272	192	2,770
12months	-1.226*** (0.000)	-3.956*** (0.000)	-1.429*** (0.000)	-0.596 (0.498)	(0.035) 0.888
obs	6,394	1,166	2,276	188	2,764
18months	-1.606*** (0.000)	-4.129*** (0.000)	-1.867*** (0.000)	-1.151 (0.180)	-0.352* (0.099)
obs	6,324	1,154	2,262	182	2,726
24months	-1.573*** (0.000)	-3.787*** (0.000)	-1.916*** (0.000)	-1.393* (0.091)	-0.408** (0.028)
obs	6,170	1,088	2,214	178	2,690
Across-family merger					
6months	-2.952** (0.040)	-7.661** (0.015)	-0.299 (0.855)	10.389*** (0.000)	-1.205 (0.498)
obs	492	188	212	14	78
12months	-2.334** (0.018)	-5.903*** (0.004)	0.182 (0.877)	5.796*** (0.000)	-2.126 (0.152)
obs	492	186	212	14	80
18months	-2.313*** (0.004)	-2.804* (0.088)	-2.259** (0.048)	3.279*** (0.001)	-2.179** (0.025)
obs	486	182	212	12	80
24months	-2.032*** (0.001)	-3.326** (0.012)	-1.694* (0.056)	1.081 (0.508)	-0.518 (0.506)
obs	482	178	212	12	80

Table 8. Average treatment effects on treated for propensity score matching on funds' objectives, age, size, flows, fund-family and expense ratios for broadly defined objectives. The annualized cumulative returns calculated over the period specified in the first column are the variables of interest. The exit funds and sub-categories (liquidation funds, funds merged within their own fund-family and funds merged outside the own fund-family are the treated sample. The matching with the surviving funds is done on funds' objectives, age, size, flows, fund-family and expense ratios. P-values are reported in parenthesis. *** p<0.001; **p<0.05; *p<0.01.

<i>All exit funds</i>	2000–2014	1/2000–3/2003	4/2003–9/2008	10/2008–3/2009	4/2009–12/2014
6months	-1.431*** (0.000)	-2.456*** (0.000)	-1.862*** (0.000)	1.413 (0.175)	-1.045*** (0.002)
obs	12,066	1,986	3,828	516	5,736
12months	-1.755*** (0.000)	-3.517*** (0.000)	-1.693*** (0.000)	0.556 (0.474)	-1.372*** (0.000)
obs	12,046	1,984	3,834	498	5,730
18months	-1.772*** (0.000)	-3.400*** (0.000)	-2.055*** (0.000)	-0.364 (0.600)	-1.143*** (0.000)
obs	11,728	1,934	3,760	472	5,562
24months	-1.738*** (0.000)	-3.698*** (0.000)	-2.046*** (0.000)	-0.829 (0.151)	-0.947*** (0.000)
obs	11,262	1,794	3,668	456	5,344
<i>Liquidation</i>					
6months	-2.207*** (0.000)	-0.953 (0.504)	-3.349*** (0.000)	-1.182 (0.569)	-2.117*** (0.001)
obs	3,968	540	1,054	180	2,194
12months	-2.411*** (0.000)	-3.363*** (0.002)	-2.496*** (0.000)	-1.376 (0.376)	-2.197*** (0.000)
obs	3,940	542	1,052	168	2,178
18months	-2.225*** (0.000)	-3.163*** (0.001)	-2.565*** (0.000)	-2.001 (0.167)	-1.862*** (0.000)
obs	3,734	510	1,008	160	2,056
24months	-2.138*** (0.000)	-4.302*** (0.000)	-2.337*** (0.000)	-1.913 (0.107)	-1.530*** (0.000)
obs	3,474	444	966	150	1,914
<i>Within-family merger</i>					
6months	-0.640*** (0.007)	-2.168*** (0.001)	-1.072*** (0.003)	0.377 (0.738)	0.286 (0.423)
obs	6,330	1,156	2,262	186	2,726
12months	-1.109*** (0.000)	-3.143*** (0.000)	-1.263*** (0.000)	-0.534 (0.474)	-0.166 (0.511)
obs	6,338	1,152	2,268	186	2,732
18months	-1.467*** (0.000)	-3.616*** (0.000)	-1.673*** (0.000)	-1.143 (0.144)	-0.421** (0.049)
obs	6,286	1,142	2,256	182	2,706
24months	-1.529*** (0.000)	-3.681*** (0.000)	-1.808*** (0.000)	-1.593** (0.036)	-0.426** (0.018)
obs	6,146	1,080	2,212	178	2,676
<i>Across-family merger</i>					
6months	-2.920** (0.040)	-6.925** (0.031)	-1.521 (0.341)	8.802** (0.014)	0.722 (0.714)
obs	490	186	212	14	78
12months	-2.035** (0.031)	-4.561** (0.032)	-0.925 (0.390)	5.484*** (0.000)	-0.421 (0.763)
obs	492	186	212	14	80
18months	-1.859** (0.014)	-1.611 (0.335)	-2.578** (0.011)	2.960*** (0.003)	-1.243 (0.194)
obs	486	182	212	12	80
24months	-1.677*** (0.006)	-2.320* (0.077)	-1.986** (0.016)	0.759 (0.649)	0.210 (0.797)
obs	482	178	212	12	80